

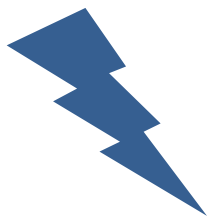
*A newsletter of*

**Indian Association of Energy Management Professionals**

# **The Urja Watch**

**January 2011, Vol. IV/Issue 26**

***It is about “Conscience Keeping on Energy Matters”***



## **The Energy Water Nexus**

**The Urja Watch**  
**January 2011 Vol. IV/Issue 26**

**The Energy Water Nexus**

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## From the Editor...

### The Energy Water Connection



Welcome to 2011! As at the beginning of every New Year, we raise our hopes for a better future. However, problems do not vanish just by hopes; they need to be effectively addressed through appropriate strategies and solutions. We live in an era of shortages and are already facing severe energy shortages. In addition, the quality and availability of water is an increasingly critical issue in India. With ever-increasing population, more number of people will seek energy, food, and water making the situation much worse than what it is today.

Energy is essential for moving water from its source to the various points of consumption. Energy is also needed to treat the water, make it potable, and to remove waste materials from it. Water distribution and energy consumption are thus closely linked. Water consumed in agricultural operations, industrial processes, educational institutions and urban homes represents a significant amount of energy and cost. Therefore, any activities that are planned to save both energy and water need to be encouraged.

Typically, energy use can account for up to 40% of the operating budget of a water/wastewater treatment facility. Each of the components of a pumping system (pumps, motors, pipes, drives, and valves) has certain efficiency, which together contribute to the overall system efficiency. Because pumping fluids at water treatment plants accounts for most of a facility's energy costs, using pumps efficiently can help minimize those costs. In fact, many pumping systems are not operated at the best efficiency. Many of the older water treatment plants in India were designed at a time when energy conservation was not considered a serious issue - energy was neither expensive nor in severe short supply. Many of such old treatment facilities may be outdated and are likely at or near their design life. They will soon be in need of repair, upgrade or replacement. An ideal time to improve energy management practices is when repairing or upgrading such facilities. Modern pumps offer improved efficiency. Variable Frequency Drives (VFD) are increasing in popularity at wastewater facilities where the greatest energy use is from pumping and aeration—two applications particularly suited to VFDs. Many commercial and industrial facilities have benefited financially by making a range of improvements in water pumping and treatment systems.

Municipalities can greatly benefit from improved energy management. Many municipalities in India spend over half of their energy budgets for water pumping making it attractive to adopt energy-saving measures. Describing the linkage between water and energy as “watergy” in the context of municipalities, The Alliance to Save Energy has done some interesting work for water utilities in Karnataka, Maharashtra and elsewhere.

Indian agriculture is heavily dependent on groundwater and also energy to pump water. Over 80% of fresh water is used for agriculture but with very poor irrigation efficiency. Agriculture accounts for about one-thirds of the total electricity consumption in India. There are considerable losses in both water and energy because of operational inefficiencies. In many parts of India, over exploitation of ground water has resulted in the lowering of water tables. Despite such heavy detrimental impact on the country’s precious resources, most farmers are not adopting any water or energy saving technologies. The technical and financial performance of India’s power sector, particularly in the large agricultural states, is intimately linked to how water is used, priced and managed. The flat-rate tariff structure and poor operating efficiencies are responsible for unsustainable exploitation of groundwater and the high energy losses associated with irrigation water pumping.

Commercial buildings such as hotels too waste water and energy. In one of the star hotels that I stayed in, the water shower in the bathroom struck me like bullets. Why not such hotels use efficient showerheads to cut water and energy consumption? By doing so, they will not only save money but also increase customer comfort.

Addressing water and energy use efficiencies is a complex job as it involves a combination of several interdependent components. It needs a coordinated policy dialogue on power and water sector reforms to develop a pragmatic framework for implementation. In order to advance energy and water use efficiency in the agricultural sector, it is prudent to involve the farmers as partners in the water/energy reforms. There is also an urgent need to develop a sustainability code for Indian industries in the use of water and energy. The goal would be to set high standards, educate owners and managers on the benefits of being efficient and to motivate them to improve business processes.

A lot of work needs to be done on the energy and water fronts. The right time to begin is now!

Energetically,

S. Subramanian

## **Elaborating on the Nexus Between Energy and Water**

Jakob Granit

Like energy, water is used in different forms and cuts across most development functions in society. With growing populations and economies, the demand for water for food production and energy production (bio-energy and hydropower), and water for industry and domestic use is steeply increasing at the local, national and regional levels. During the past hundred years the world's population has tripled and the use of water has increased six fold during the same time. Recent data indicates that a global 40% water supply gap of accessible and reliable water supply for economic development is expected by 2030. This at a time when there are still tremendous challenges in providing access to safe drinking water for nearly 1.1 billion people, proper sanitation for over 2 billion people and providing food to market for over 1 billion people that are suffering from under-nourishment. Broad-based water service interventions in water supply and energy utilities, water and sanitation and irrigation services benefit everyone and play a major role in improving sustainable and dignified livelihoods. Long term climate change, on top of existing rainfall variability, will provide additional water management challenges. Droughts and floods will increase and cause shocks to both developing and developed economies.

Against this background, it comes as no surprise that the political economy behind the allocation of scarce water resources for different purposes, including for vital ecosystem functions, is beginning to shape public policy. For example, successful countries in regions with limited water resources are diversifying their economies away from over reliance on agriculture and are putting in place water demand management systems to save water for higher value use. Such higher value use would include water for industry, services and modernizing agriculture by moving production from grains to other crops such as vegetables fetching higher market prices.

Energy is required in all the steps along the water value chain, from providing water services such as pumping water for water supply and sanitation systems, to the delivery of irrigation water for food and bioenergy production, to the construction of large scale water storage for flood protection. As water resources become scarce, water will be pumped long distances, or be produced through alternative means, such as energy intensive desalination processes. Modern water management, including establishing monitoring networks and data centers, is dependent on reliable access to electricity.

To achieve water security, which means the provision of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, energy must be available. The links between these two key assets for building societies, water and energy, need to be further explored and strengthened.



Image courtesy of [IBM Smarter Planet](#)

Water does not conform to borders. There are an estimated 261 river basins globally that cross international borders, not to mention boundaries within countries. These trans-boundary river basins cover about 45% of the earth's surface. Some of the most contested river basin systems in the world are found in dry regions such as the Middle East and Africa where international cooperation is weak and civil strife and tensions prevent cooperation on these shared assets. Competition for water resources between states, within states and between different sectors is increasing.

This is partly because of the upstream and downstream dimension where water flows from high to low lying areas which provides opportunities for upstream countries or users to have some control over both the quantity and quality of downstream water flow.

The cooperative management of trans-boundary river basins and the sharing of benefits from development therefore pose serious challenges, since all states in a trans-boundary river basin depend on each other. But if the aggregate benefits from common use of water are larger than those of systems in which water allocations and management take place at the unilateral level, then there will be incentives for cooperation, driving regional integration. Research has shown that regions which have removed barriers to trade and increased interactions between states have experienced a relative increase in prosperity and stability when compared to regions with more limited cooperation. The development of hydropower, including irrigation and flood control, in multipurpose schemes provides tangible benefits that can be distributed at the regional level. Other benefits include industry, food and health outputs, as well as environmental services for biodiversity conservation and tourism that all can be generated at the local or regional level. Benefit sharing schemes based on water and energy bring opportunities for small and isolated economies and stimulate growth in larger economies.

While industrialized countries have invested significantly in building water management capacity and water infrastructure, many developing countries have not. In hydropower development, for example, industrialized countries use most available hydroelectric potential as a source of renewable energy. At a global level hydropower contributes about 20% of the world's electricity generating capacity. The most significant hydropower capacity is in developing countries, which in many cases harness only a small fraction of their available hydropower potential. In Africa, only 7% of the technical and economic hydropower potential is exploited compared to 22% in Asia, 69% in North America and 75% in Europe. In existing hydropower facilities, opportunities to increase electricity outputs may exist by using up-to-date technology. Hydropower provides future price security, and for countries with indigenous supply, it reduces foreign exchange requirements for fuel purchases. The environmental appeal of hydropower generation gained from the reduction of pollution and greenhouse gas emissions is well established. Most growth scenarios still depend on fossil fuels as the dominant source of energy worldwide, regardless of the emissions impact. With demand for electricity expected to grow over 70% between now and 2030 and with a projected 1.3 billion people still lacking access to electricity by that date, the role of hydropower as a renewable source of energy will be important in providing energy security.

Between growing energy demand and the fact that a large proportion of available water resources are shared between nation states, there is a need to find smarter ways of cooperating around the water and energy nexus. Scenarios indicate that if it is possible to increase water use efficiency, then available water resources would be able to meet the development needs of 9 billion people. These scenarios do not take into consideration the uncertainty of shifting water use away from food production to bio-energy production. In this context we can learn from how electricity markets operate at the regional level through power pooling between several countries, such as in the Nordic Power Exchange (Nord Pool), which is the single power market exchange for Scandinavian countries. The power market allows different sources of fuel, including hydropower, to be balanced in the system and for price efficiency and physical market trading for the following day hour by hour. Today Nord Pool market membership includes energy producers, industries, large consumers, distributors, utility companies and financial institutions. It started off as a bilateral cooperation in the early 1990s and has now developed into a multi-country market mechanism with further integration into the larger European energy market.

Water in the Middle East has always been a scarce resource. The Middle East region hosts 5% of the world's population, but only 1% of the world's renewable water resources. About 60% of the available freshwater is in trans-boundary basins. Per capita availability of water is the lowest, rates of withdrawal already the highest, and more water storage has been installed than in any other region of the world. But there are still millions in the region for whom pathways out of poverty will rely on access to, and use of, more water and energy. The agricultural sector is by far the most demanding in terms of water withdrawal. It consumes on average about 80% of the freshwater resources. The Gulf States, dominated by oil industries, still use a considerable amount of water for agricultural purposes despite receiving relatively small contributions to GDP from this sector.

Some countries in the region enjoy extreme wealth while some are among the poorest in the world. The region is expected to double its population in the next 40 years. Poverty reduction and distribution of wealth are of critical importance for regional development. Water is prominent in the national politics of virtually every Middle East nation, while at the same time regional collaboration is weak. The availability of reasonably priced electricity is a major factor in resolving the interconnected issues of population, poverty, and environmental sustainability. The generation of electricity through hydropower provides a direct feedback loop to water management in the region.



The trans-boundary nature of the water resources in the Middle East makes cooperative management of these resources critical. The same is relevant for energy, where co-management of electricity networks will increase the possibilities for individual countries to get access to a larger set of cost effective energy sources. Hydropower contributes more than 12% to the total electricity supply in the region. The countries with the best opportunity to develop and use hydropower in trans-boundary river basins, and reduce fossil fuel dependency in the future, are Iran, Iraq, Syria, and Turkey.

The current availability and future potential of electricity supply in the Middle East region depends on several factors, including in-country fossils fuels, hydroelectricity, renewable energy sources, and wealth—which allows for imports of fuels or electricity. The overall energy balance will be affected by the extent to which demand-side management can be applied to reduce total energy consumption and the region's ability to increase supply through renewable energy sources, such as solar and wind power. The region primarily depends on indigenous or imported fossil fuels for power generation. However, the generation of hydroelectricity makes an important contribution in certain countries. This is usually associated with multipurpose applications, such as flood control and irrigation, which are also important to the economies of these countries. In many cases these non-energy benefits provide the primary justification for the construction of hydro projects.

The availability and use of significant hydroelectric resources is directly dependent on the water resources of the region in which the country is located. All countries in the Euphrates and Tigris River Basin (Iran, Iraq, Syria and Turkey) have significant hydroelectric generation supply and potential. However, the countries that are located in the Jordan River Basin (Israel, Jordan, Lebanon, the West Bank), and the Arabian Peninsula (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, UAE, and Yemen) have minimal water supplies, and no hydroelectricity generation potential. Egypt benefits from substantial energy generation on the Nile, which is shared by ten riparian countries and will have access to upstream hydropower from Sudan and Ethiopia, if cooperation on this major river basin system can move forward.

The most cost effective option to meet future electricity demand in the Middle East is therefore to develop and share the energy resources through power pools and to import electricity from regions with surplus. The trans-boundary water resources in the Euphrates and Tigris basin, and beyond the region in Central Asia and the Nile Basin, feature large hydropower development opportunities that can provide cost-effective hydroelectricity for a Middle East regional market.

Many countries already share electricity grids and plans to connect them to regional networks, such as the Gulf Cooperation Council (GCC) interconnection project. Larger regional plans still have far to go before reaching the implementation phase, but dialogue is ongoing throughout the region, including on a Mediterranean power pool. The role of hydropower as a source of fuel in these projects will be important.

Innovating new methods to tackle the water and energy nexus in a cooperative manner can provide prosperity and incentives for regional integration and help meet growing demand for both water and energy in many regions in the world, and particularly the Middle East region. To achieve these benefits, better cooperative management and development of trans-boundary water resources in the major basins in the Middle East, including the Euphrates-Tigris basin, the Jordan basin, and the Nile Basin, will be key to achieve water and greater energy security. Water flows across borders and crosses many boundaries, and yet cooperation is limited on this shared natural resource. Cooperation over energy exists and can be found in bilateral trade agreements and transmission interconnection projects, even in areas with civil strife. Tackling trans-boundary water management and development from a practical and outcome-oriented approach, such as in the case of energy cooperation, demonstrate how tangible benefits can be achieved at the regional level to improve livelihoods and strengthen regional integration.

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***About the author and this article:***

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**Albert Einstein said..**

**"I am thankful to all those who said NO to me.  
It's because of them I did it myself."**

## **News on Cancun Climate Change Conference**

*Editor's Note: The UN Climate Change Conference in Cancun concluded in December 2010. For the information of readers, we are providing a summary of the key decisions. **Source:** The Hindu, Business Line (Page 14), December 12, 2010.*

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The world's governments approved a modest plan to combat climate change, including a new "Green Climate Fund" to help poor nations. The key decisions taken are given below:

### **Green Climate Fund:**

- To support developing nations in obtaining clean energy technology to reduce GHG emissions and to adapt to climate change.
- Richer nations have promised US \$ 100 billion a year by 2020.
- Cancun decision does not identify specific sources of financing.

### **Deforestation:**

- To promote efforts in poorer nations to protect their climate friendly tropical forest with prospect of financial compensation from richer nations.
- Further negotiations envisaged.

### **Technology Transfer:**

- To establish a Technology Executive Committee to analyse needs and policies for transfer of technology to developing nations for clean energy and adaptation.
- Climate Technology Center to build a global network to match technology needs and suppliers.

### **'Anchoring' Pledges:**

- To inscribe in conference UN document the voluntary pledges made by some 80 nations under 2009 Copenhagen Accord.
- The decision urges developed nations to 'increase the ambition' of their targets.

### **Monitoring Pledges:**

- To strengthen the reporting requirements and review of emission reduction actions by both developed and developing countries.
- Developed nations would improve reporting on climate related financial support to poorer nations.

*Our New Delhi reporter Puneet Kumar reports on:*

## **The 20<sup>th</sup> World Petroleum Congress (WPC)**

The 20<sup>th</sup> World Petroleum Congress (WPC) is scheduled to be held at Doha, Qatar during 4 -8 December 2011.

The Theme of the Congress is:

### **Energy Solutions for All: Promoting Cooperation, Innovation and Investment.**

The triennial World Petroleum Congress is held over five days with more than 4000 delegates, 600 media and 550 presenters participating in a programme that covers all aspects of the industry, from technological advances in upstream and downstream operations, to the role of natural gas, renewable and alternative energy, the management of the industry and its social, economic and environmental impact.

Known as the “Olympian Event of the Oil and Gas Industry”, it is attended by a global oil and gas audience and outside stakeholders such as governments, other industry sectors, NGOs and international institutions who also join in the dialogue.

The World Petroleum Exhibition, held alongside the congress, and in the same venue, features exhibits from the national committees of the World Petroleum Council, which include the most prestigious national oil and gas companies and agencies of the world. It also showcases the most important international oil and gas companies alongside key suppliers, service companies and manufacturers. This is the most significant global exhibition dedicated to the oil and gas industries.

The International Congress Committee has given call for Technical Papers and Posters on a broad range of topics.

Guidelines for papers submission can be viewed at the 20<sup>th</sup> WPC website [www.20wpc.com](http://www.20wpc.com)

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# **Innovative Nexus between The Ministry of Power and The Ministry of Water Resources**

Sunil Sood

Like every year, the Bureau of Energy Efficiency (BEE) on behalf of The Ministry of Power conducted a painting competition for the students of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> standards on all India basis in the year 2010 too.

The topics for the competition included the following:

- **More stars, More savings**
- **Today's energy wastage is Tomorrow's energy shortage**
- **Energy saved is Future saved**

More than Rs. 2 Crores of money was spent on the competition in which about 15 Lakh students took part. The event involved an estimated paper consumption of over 1 Crore A1 size paper sheets equivalent to cutting down more than 4,000 trees - not to forget the consumption of paints, fuel burnt in travel, time spent by students, parents, teachers, officials and electricity used in the halls where painting competitions were held and also in the 5 star hotel in New Delhi where the award ceremony was held.

The Ministry of Water Resources joined hands with the Ministry of Power and took the help of BEE in organizing painting competitions on the theme of '**Save Water.**' Both competitions were held at the same time in State Capitals.



Children Painting on  
'Save Energy' Theme



Children Painting on  
'Save Water' Theme

## IAEMP News

*On the recent "National Energy Conservation Day" (December 14, 2010), IAEMP conducted a public protest campaign in New Delhi over BEE's indifference on certain issues. A report from IAEMP's President:*

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December 14, 2010

Dear All,

I am really very happy to inform every one that the Public Protest Campaign has taken off very well at New Delhi on December 14, 2010. The highlights:

- We organised sit-in at Jantar Mantar and also campaigned on road with display of banners.
- Media persons covered our protest and some of them have promised to take the story forward.
- We had taken the permission from Police. They were very nice and also arranged delivery of our representation at the office of Minister of Power and handed over an acknowledgment from the Ministry.
- We went to BEE office but it was closed for today as they were all enjoying the party at Hotel Le-Meridian ( 5 Star) in connection with National Energy Conservation day.



Myself, Mr. Vaidyanathan, Mr. Sood, Mr. Pradeep and others were present whole day. We could draw attention from the general public as well since many people came to us inquiring about loss of Rs. 5 Lakhs Crores worth of energy savings.

I am attaching two snap shots. We will conduct similar protests in other cities & launch intense internet campaign

Best Regards,

Bhupal Singh  
President, IAEMP

## Upcoming Events

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### **Carbon Markets and Climate Finance, January 26, 2011**

Organised by: Green Power Conferences, Venue: Johannesburg

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### **India Solar Energy Summit New Delhi, India February 17-18, 2011**

[www.indiasolarenergysummit.com](http://www.indiasolarenergysummit.com);

E Mail: [alans@noppen.com.cn](mailto:alans@noppen.com.cn)

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### **Renewable Energy World India 2011, New Delhi, May 5-7, 2011**

<http://www.renewableenergyworldindia.com>

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### **T&D India 2011-India's Premier Exhibition and Networking Event for the Transmission & Distribution sector.**

**Mumbai, September 29-October 1, 2011**

<http://www.indiaenergy.net/td2011>

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*"Waste is worse than loss. The time is coming when every person who lays claim to ability will keep the question of waste before him constantly. The scope of thrift is limitless."*

- Thomas A. Edison

## Share your experience

Do you have an area of expertise in energy management? Have you solved a difficult problem or have an interesting case study? Do you want to share a joke with others? Or just have a word of appreciation for this issue. Share your knowledge with others and promote yourself through **The Urja Watch**.

You may also tell us about upcoming energy-related events in your area. Be sure to mention the title of the event, organizers, dates, venue, city, and contact information to get more details of the event.

Please note the following points while making your submissions:

- ❖ Articles must be original, in electronic version, 500 words or less. If you are using material from external sources, please acknowledge them.
- ❖ Please include contact information (full name, title/organization, phone numbers, and email ID) with your submission.
- ❖ Articles should be in MS word, single spaced, with easily readable font, preferably Arial size 12. Photos should be of high resolution.
- ❖ Please e-mail your submissions to The Editor, “The Urja Watch” at [tellsubi@gmail.com](mailto:tellsubi@gmail.com)
- ❖ There are no deadlines for submissions. You may submit articles anytime.
- ❖ We reserve the right to edit, rewrite or reject any article.

## We Need Your Feedback Too!

Please write your views and suggestions to the editor at: [tellsubi@gmail.com](mailto:tellsubi@gmail.com)  
Letters must include the writer's name, address, phone and email ID.

We appreciate your feedback and thank you for your support.

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